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Design and implementation of reconfigurable gateway array of multiple fabrics (RGAMF)

Qin Zhang [Peng Li](#) [Jizhong Han](#) [Chengde Han](#)
Inst. of Comput. Technol., Chinese Acad. of Sci., China

This paper appears in: [Networking, Architecture, and Storages, 2006. NAS '06. International Workshop on](#)

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Abstract

In today's data center, the demand on server I/O is increasing to transfer huge data between clients and servers or between two servers. Typically, conventional data center uses multiple network adapters to build the server fabric, which bring many drawbacks, such as complex management, hard scalability and expensive cost, and so on. Fortunately, InfiniBand provides a high-bandwidth, low-latency network, and it has been widely used in current data center to create a unified fabric. However, fiber channel and IP fabric are still widely adopted so that many researches have been focused on connecting between InfiniBand and conventional networks. Many methods, such as protocol conversion and bandwidth aggregation, have been proposed to eliminate performance limitation caused by heterogeneous fabrics. Nevertheless, diversity and dynamic requirements of server I/O on data center still didn't be considered. This paper proposes a novel heterogeneous interconnect architecture called RGAMF (reconfigurable gateway array of multiple fabrics), which has five major features: protocol conversion, bandwidth aggregation, virtual service mapping, dynamic reconfiguration and redundant array. Through verification and evaluation, latency of RGAMF is between 1us and 2us, and the bandwidth of all IP links is close to wire speed at 1Gbps in both directions. Based on the FPGA (field programmable gate array) embedded in each gateway of array, this architecture also provides better flexibility and scalability.

Index Terms

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[bandwidth allocation](#) [client-server systems](#) [field programmable gate arrays](#)
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Non-controlled Indexing

1 Gbit/s IP fabric IP links InfiniBand bandwidth aggregation data center dynamic reconfiguration fiber channel field programmable gate array heterogeneous interconnect architecture high-bandwidth network low-latency network protocol conversion reconfigurable gateway array of multiple fabrics redundant array server I/O virtual service mapping

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10 L440 L368 L2526 L1

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L6 710/240,74,300,316,3,36,38,314,315;711/151,114,154,203;714/5,6,43;370/351,431,464,906,910.

L5 (storage or disk or disc) same redundant same virtual\$7

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L2 L1 and (physical same serial\$2)

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L9

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Set
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L9 L8 and (physical same serial\$2)

L8 L7 and (SVC or PSD or ATA or SCSI)

L7 L5 and L6

L6 710/240,74,300,316,3,36,38,314,315;711/151,114,154,203;714/5,6,43;370/351,431,464,906,910.

L5 (storage or disk or disc) same redundant same virtual\$7

DB=PGPB; PLUR=YES; OP=OR

L4 L3 and (physical same serial\$2)

L3 11.clm.

L2 L1 and (physical same serial\$2)

L1 (storage or disk or disc) same redundant same virtual\$7

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